

What is claimed is:

1. A mobile station transmitting data to and receiving data from an external base station at high speed, the mobile station comprising:

- a mobile station communication controller for processing data including control data to output a predetermined data frame;
- a mobile station source coder for receiving the data frame and performing source coding on it according to a predetermined coding method to output coded data;
- a first modulator for receiving a first carrier having a predetermined frequency and modulating the coded signal from the mobile source coder using the first carrier to generate a first modulated signal;
- a second modulator for receiving a second carrier having a predetermined frequency and performing modulation on the first modulated signal using the second carrier to generate a modulated uplink signal;
- a mobile station interfacer for transmitting the modulated uplink signal to the base station and receiving a modulated downlink signal from the base station;
- a first demodulator for receiving and demodulating the modulated downlink signal received from the base station via the mobile station interfacer and outputting demodulated data; and
- a mobile station source decoder for performing source decoding on the demodulated data from the first demodulator to convert the demodulated data to a baseband signal.

2. The mobile station of claim 1, wherein the mobile station source coder performs coding according to a Manchester coding method, and the mobile station source decoder performs decoding according to a Manchester decoding method.

3. The mobile station of claim 1, wherein the second carrier is provided from the base station.

4. The mobile station of claim 1, wherein the first modulator performs differential phase shift keying (DPSK) modulation, the second modulator performs

amplitude shift keying (ASK) modulation, and the first demodulator performs ASK demodulation.

5. A base station transmitting data to and receiving data from an external mobile station at high speed, the base station comprising:

a base station communication controller for processing data including control data to output a predetermined data frame;

a base station interfacer for receiving a modulated uplink signal from the mobile station and transmitting a modulated downlink signal to the mobile station;

a mixer for mixing the modulated uplink signal with a predetermined intermediate frequency and filtering the mixed signal to convert the modulated uplink signal to a signal having the predetermined intermediate frequency;

an oscillator for generating the predetermined intermediate frequency;

a base station demodulator for demodulating the output signal of the mixer to generate a baseband signal according to a predetermined demodulation method;

a base station source decoder for receiving the baseband signal from the base station demodulator and performing source decoding according to a predetermined method;

a base station source coder for performing source coding the data frame output from the base station communication controller; and

a base station modulator for modulating the output data of the base station source coder according to a predetermined method and outputting modulated data to the base station interfacer.

6. The base station of claim 5, wherein the base station modulator outputs a modulated signal for a predetermined time and then outputs only a carrier having a predetermined frequency until a response is received from the mobile station.

7. The base station of claim 5, wherein the base station demodulator performs differential phase shift keying demodulation, and the base station modulator performs amplitude shift keying modulation.

1 8. The base station of claim 5, wherein the base station source decoder
2 performs decoding according to a Manchester decoding method, and the base
3 station source coder performs coding according to a Manchester coding method.

1 9. The base station of claim 5, wherein the base station demodulator
2 comprises:
3 an amplitude limiting amplifier for receiving the output signal of the mixer and
4 removing noise, thereby outputting a reliable signal;
5 a phase shifter for shifting the output signal of the amplitude limiting amplifier
6 by a predetermined phase;
7 a quadrature detection receiver for receiving the output signal of the
8 amplitude limiting amplifier and the output signal of the phase shifter, comparing the
9 two signals to calculate the phase difference between them and filtering a signal
10 corresponding to the calculated phase difference to output the variation of voltage;
11 and
12 an amplitude comparator for comparing the output signal of the quadrature
13 detection receiver with a predetermined reference value.

1 10. A data communication method of a mobile station transmitting data to
2 and receiving data from an external base station at high speed, the data
3 communication method comprising the steps of:
4 processing data including control data to form a predetermined mobile station
5 information data frame;
6 coding the mobile station information data frame according to a
7 predetermined source coding method and performing primary modulation on the
8 coded data frame using a predetermined first carrier according to a first
9 predetermined modulation/demodulation method;
10 performing secondary modulation on the primarily modulated signal using a
11 predetermined second carrier according to a second predetermined
12 modulation/demodulation method and transmitting the secondarily modulated signal
13 to the base station;

14 demodulating a modulated downlink signal transmitted from the base station
15 according to the second predetermined modulation/demodulation method and
16 generating the demodulated signal as a source coded signal; and
17 decoding the source coded signal according to a predetermined source
18 decoding method to reconstruct original data.

1 11. The data communication method of claim 10, wherein the step of
2 performing the secondary modulation comprises the step of performing modulation
3 based on the second carrier received from the base station.

1 12. A data communication method of a base station transmitting data to
2 and receiving data from an external mobile station at high speed, the data
3 communication method comprising the steps of:
4 receiving a modulated uplink signal transmitted from the mobile station to the
5 base station, mixing the modulated uplink signal with a predetermined intermediate
6 frequency and filtering the mixed signal to generate an intermediate signal having
7 the predetermined intermediate frequency;
8 demodulating the intermediate signal according to a predetermined
9 demodulation method to generate a baseband signal;
10 source-decoding the baseband signal according to a predetermined method
11 to reconstruct original data received from the mobile station;
12 processing data including control data to form a data frame and source-
13 coding the data frame; and
14 modulating the source coded data frame according to a predetermined
15 method and transmitting the modulated signal to the mobile station.

1 13. The data communication method of claim 12, wherein in the
2 modulating step, the modulated signal is output for a predetermined time, and then
3 only a carrier having a predetermined frequency is output until there is a response
4 from the mobile station.

14. An electronic toll collecting system for collecting a toll, the electronic toll collecting system comprising a mobile station and a base station, wherein a variety of data including a toll is transmitted and received between the mobile station and the base station at high speed,

the mobile station comprising:

a mobile station communication controller for processing control data and information including start place information and balance to form and output a mobile station information data frame, receiving base station information data including destination information and billing information from the base station, and recalculating and updating the balance;

a mobile station source coder for receiving the mobile station information data frame and performing source coding on it according to a predetermined coding method to output coded data;

a first modulator for receiving a first carrier having a predetermined frequency and modulating the coded signal from the mobile source coder using the first carrier to generate a first modulated signal;

a second modulator for receiving a second carrier having a predetermined frequency and performing modulation on the first modulated signal using the second carrier to generate a modulated uplink signal;

a mobile station interfacer for transmitting the modulated uplink signal to the base station and receiving a modulated downlink signal from the base station;

a first demodulator for receiving and demodulating the modulated downlink signal received from the base station via the mobile station interfacer and outputting demodulated data; and

a mobile station source decoder for performing source decoding on the demodulated data from the first demodulator to generate a baseband signal and transmitting the baseband signal to a base station communication controller,

the base station comprising:

a base station interfacer for receiving a modulated uplink signal from the mobile station and transmitting a modulated downlink signal to the mobile station;

31 a mixer for mixing the modulated uplink signal with a predetermined
32 intermediate frequency and filtering the mixed signal to generate a signal having the
33 predetermined intermediate frequency;
34 an oscillator for generating the predetermined intermediate frequency;
35 a base station demodulator for demodulating the output signal of the mixer to
36 generate a baseband signal;
37 a base station source decoder for receiving the baseband signal from the
38 base station demodulator and performing source decoding according to a
39 predetermined method;
40 a base station communication controller for analyzing the mobile station's
41 information data which is decoded and output by the base station source decoder to
42 calculate a toll and processing data link layer control data and base station
43 information data including destination information and billing data to form and output
44 a predetermined base station information data frame;
45 a base station source coder for performing source coding the base station
46 information data frame; and
47 a base station modulator for modulating the output data of the base station
48 source coder according to a predetermined method and outputting modulated data
49 to the base station interfacer.

1 15. The electronic toll collecting system of claim 14, wherein the mobile
2 station source coder and the base station source coder perform coding according to
3 a Manchester coding method, and the mobile station source decoder and the base
4 station source decoder perform decoding according to a Manchester decoding
5 method.

1 16. The electronic toll collecting system of claim 14, wherein the second
2 carrier is provided from the base station.

1 17. The electronic toll collecting system of claim 14, wherein the first
2 modulator performs differential phase shift keying (DPSK) modulation, the base
3 station demodulator performs DPSK demodulation, the second modulator and the

base station modulator perform amplitude shift keying (ASK) modulation, and the first demodulator performs ASK demodulation.

18. The electronic toll collecting system of claim 14, wherein the base station demodulator comprises:

an amplitude limiting amplifier for receiving the output signal of the mixer and removing noise, thereby outputting a reliable signal;

a phase shifter for shifting the output signal of the amplitude limiting amplifier by a predetermined phase;

a quadrature detection receiver for receiving the output signal of the amplitude limiting amplifier and the output signal of the phase shifter, comparing the two signals to calculate the phase difference between them and filtering a signal corresponding to the calculated phase difference to output the variation of voltage; and

an amplitude comparator for comparing the output signal of the quadrature detection receiver with a predetermined reference value.